

WATER LINES

NEWS FROM THE WATER RESOURCES DIVISION
OF THE MONTANA DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION

DEPARTMENT NEWS

THE UPPER YELLOWSTONE RIVER CUMULATIVE EFFECTS INVESTIGATION: TRANSLATING SCIENCE INTO PUBLIC POLICY

By Jim Robinson

The Yellowstone River is the focus of growing ecological, economic, social, and political concerns. Recent events and activities include the floods of 1996 and 1997, substantial increases in stream bank stabilization and containment activities, debate over the impact of bank stabilization on the river and its ecosystem, legal challenges to permitted actions, confusion over the responsibilities and authority of various agencies, and fragmented efforts to study the cumulative effects of stream bank stabilization. In the fall of 1997, Governor Racicot appointed the Upper Yellowstone River Task Force to provide a public forum for discussion of certain problems related to the river, within Park County, and to devise solutions to these problems.

The overall goal of the task force is to develop a set of publicly supported river corridor management recommendations that address potential adverse cumulative effects of river channel modification and floodplain development. These



Yellowstone River near Allens Spur - Photo by Jim Robinson

management recommendations will provide a basis for improved regulation of projects proposed within the active stream channel and adjacent floodplain. Development of the management recommendations involves five major phases:

1. Resource data collection, analysis, and mapping
2. Resource condition assessment
3. Development and evaluation of management options
4. Selection of preferred management options

5. Preparation of management recommendations.

To implement phases 1 and 2, the task force commissioned the Upper Yellowstone River Cumulative Effects Investigation. With assistance from the Department of Natural Resources and Conservation (DNRC), Water Management Bureau a technical proposal was developed, and, in 1999, the Montana Legislature awarded the Task Force \$300,000 from the Reclamation and Development Grants Program to conduct an interdisciplinary

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DEPARTMENT OF NATURAL RESOURCES AND CONSERVATION — WATER RESOURCES DIVISION

"To provide the most benefit, through the best use, of the state's water resources for the people of Montana."

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DNRC - WATER RESOURCES DIVISION HIRES NEW BUREAU CHIEF

By *Cindy Forgey*

Curt Martin was recently hired as the new Water Rights Bureau Chief for the Helena Central Office. Curt was born and raised in Miles City, Montana. He attended and graduated from Montana State University (MSU) with a Bachelor of Arts degree in political science in public administration. He went on to receive his Master of Public

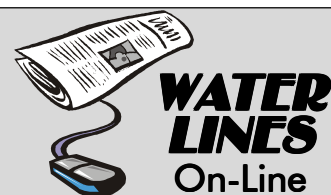


Curt Martin - Photo by *Cindy Forgey*

Administration degree in Natural Resource Management, also from MSU.

Curt has a strong record of achievement as a research assistant with The 49th Parallel Institute at MSU and with the Environmental Quality Council, as a planner and supervisor of the Water Management Bureau's Planning Section, and more recently as the regional manager of the Missoula Regional Office.

Curt will be a great addition to the Helena Central Office. His ability to work well with a wide range of people, along with a sharp mind for the complexities of water policy, combine with his commitment to practical approaches to make Curt an effective problem-solver and respected coworker. Curt assumed his duties as bureau chief in Helena on November 6th.



Water Lines can now be accessed on the Web at: www.dnrc.state.mt.us/wrd/newsletters.htm. We will be developing an e-mail address list to notify readers when the newest issue of **Water Lines** has been posted on the Web.

If you prefer to be on our e-mail notification list, rather than our mailing list, please send your e-mail address, with a message stating you would like to be notified, to: cforgey@state.mt.us.

Upper Yellowstone River...

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scientific investigation. The investigation is managed by the task force through an appointed technical advisory committee that is responsible for ensuring coordination and consistency between study components.

Additional funding for the effort has been obtained from a variety of sources: the U.S. Army Corps of Engineers, the Montana Departments of Environmental Quality and Transportation, and the U.S. Environmental Protection Agency through the \$319 grant program. The multi-year investigation has now been under way for about a year; the study reach includes the active channel and immediately adjacent floodplain from Gardiner to Springdale - a river distance of about 80 miles. Data collection

activities to date include acquisition of large-scale aerial photography and preparation of orthophoto quadrangles of the study reach, channel surveying by the U.S. Geological Survey (USGS) in support of floodplain mapping and hydraulic analysis, cottonwood aging as part of the riparian investigation by the University of Montana, and fishery population surveys conducted by the Fishery Research Unit at Montana State University.

Another fundamental component of the overall scientific effort is the investigation into historical channel changes and geomorphology conducted by DNRC's Water Management Bureau. Geomorphic data collection activities have included reconnaissance mapping, channel

classification, and sediment size distribution. Fieldwork for the geomorphic component began in 1999 and was conducted through the late summer and fall of 2000.

Work in progress on historical channel changes involves digitizing and overlaying recent and historical channel alignments from USGS topographic quadrangles. Those segments with excessive channel shifting will be more closely examined using historical air photo coverage to determine channel migration rates. Digitizing services for the historical channel mapping are being provided by DNRC's Information Technology Bureau with technical support and guidance from DNRC's Water Resources Division (WRD) GIS program manager.

FEASIBILITY STUDIES COMPLETED AT BAIR AND NEVADA CREEK DAMS

By Tim Kuehn

The feasibility study documents to rehabilitate Bair and Nevada Creek Dams have been completed and submitted to DNRC by HKM Engineering, Inc. John Sanders, DNRC project manager, has been overseeing the engineering studies, geotechnical analyses, and related tasks necessary to produce feasibility-level designs and cost estimates to rehabilitate these projects.

Bair Dam is located 0.5 mile west of the community of Checkerboard in Meagher County. The State Water Conservation Board

(SWCB) built the earth-filled dam in 1939 to store irrigation water for the upper Musselshell valley. The dam is managed by the State Water Projects Bureau (SWPB), successor to SWCB, and operated by the Upper Musselshell Water Users Association. The reservoir has the capacity to impound approximately 7,300 acre-feet.

The concrete spillway has been deteriorating for many years, and talus from an adjacent slope creeps into the spillway, creating a maintenance problem. Additionally, the capacity of the spillway does not comply to current dam safety standards. The U. S. Army Corps of Engineers (COE) designated the dam as unsafe, and the dam is classified as high hazard due to the potential loss of life should the dam breach. The reservoir has been operated at a reduced capacity for the past three years in

response to the unsafe conditions.

The feasibility study to rehabilitate Bair Dam included a geotechnical drilling program,



Aerial Photo of Bair Dam - Photo by Horizons, Inc.

geophysical analysis, and flood hydrology studies to determine the magnitude of the probable maximum flood (PMF). Numerous spillway configurations were evaluated to develop costs relating to various design capacities and to aid in the selection of an economical spillway design. An economic analysis of the project to indicate repayment ability and the economic impacts of the project was also performed. A class I cultural resources investigation of the area was included in the feasibility study. Patrick Rennie, DNRC archeologist, and John Sanders completed the class III cultural resources survey.

The Projects Bureau's preferred alternative for rehabilitation of Bair Dam is to replace the existing spillway and excavate the adjacent slope to eliminate the talus creep. The

new spillway would have a design capacity of 10,000 cubic feet per second (cfs) with an ultimate capacity of 14,000 cfs at the dam crest. The new spillway would

consist of a 65 foot wide ogee crest and a chute tapering from 65 feet wide to 32.5 foot wide. The final downstream portion of the structure would be a combination jump/flip stilling basin.

Nevada Creek Dam is located five miles south of Helmville in Powell County adjacent to Montana Highway 141. The earth-filled dam was built on Nevada Creek, a tributary of the Blackfoot River, by

SWCB in 1938. Recent aerial mapping reveals the reservoir capacity is 11,200 acre-feet of water. The Nevada Creek Dam is managed by the SWPB and operated by the Nevada Creek Water Users Association.

The primary safety deficiencies at Nevada Creek Dam are the poor structural condition of the spillway and excessive seepage downstream of the dam. It is believed that the spillway concrete was placed during freezing conditions without thermal protection, allowing accelerated deterioration of the concrete and resulting in exposed rebar on the chute walls. Some of the seepage is due to the embankment abutted to, and the spillway is built on top of permeable slump material. Like Bair Dam, Nevada Creek Dam is classified as high hazard due to

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Feasibility Studies Completed...*(Continued from page 3)*

the potential loss of life in the event of breaching, and COE has designated the dam as unsafe. In a 1981 report, COE indicated that the spillway has inadequate capacity and identified the excessive seepage as an area of concern warranting further evaluation.

The Nevada Creek Dam feasibility study included the same components as the Bair study and seepage analysis. Electrical resistivity and self-potential data were obtained to assist in evaluating the seepage problem. Additionally, test relief wells were drilled to gather data during the reservoir-filling cycle prior to final design.

The preferred alternative at Nevada Creek is to build a new primary spillway adjacent to the existing spillway. The new spillway would have a 50 foot wide ogee crest with a straight chute and a USBR Type III stilling basin. Excavation material from the new spillway would be used



Aerial Photo of Nevada Creek Dam
- Photo by Horizons, Inc.

to "bury" the old spillway. The spoil material would be placed as erodible fill that would wash out and provide an emergency spillway if flood levels exceed the 5,000 cfs design capacity of the primary spillway. The combined capacity of the two spillways would be approximately 15,000 cfs (one-half the PMF). Seepage and embankment improvement options include extending the outlet conduit 180 feet, constructing a toe berm, and installing relief wells and drainage

devices to control downstream seepage.

The State Water Projects Bureau intends to rehabilitate both projects simultaneously. DNRC will request funding from the upcoming legislative session. Loan and grant applications have been reviewed ranked for funding. Funds would

also come from hydropower earnings at DNRC's Toston Dam. The Bair Dam and Nevada Creek Dam rehabilitation plans received the first and second priorities, respectively for funding. Total expenditures for the rehabilitative efforts for both projects would be approximately \$5.2 million.

Pending legislative approval, SWPB will hire a final design consultant prior to the beginning of the fiscal year and award a contract soon after July 1, 2001.

HOW ABOUT A "NORMAL" WINTER FOR MONTANA?

By Jesse Aber

As the state slowly stops reeling from what was, in the opinion of some experts, the worst wildfire year in Montana since 1910, and perhaps the worst surface water drought since 1977, many are wondering what we can expect for temperatures and precipitation for the first half of the Year 2001. After forecasters called for a cool and wet La Nina climate anomaly for the year 2000, Montana had its third warm and dry winter in a row.

According to Ken Mielke, meteorologist in charge for the Montana Office of the National Weather Service (NWS) in Great Falls, the year 2000 seemed to be like 1999, ranked as the third warmest and 36th driest over the 105-year record. La Nina year 1998 ended up in the record books as the fifth warmest and the 83rd driest. As of October 1, year 2000 is currently ranked as the ninth warmest and 15th driest over the period of record.

Of course, precipitation deficits do not end with calendar years, and indeed impacts become

even more debilitating when dry years are back-to-back. Precipitation deficits for the year 2000 currently range from about an inch at Bozeman to nearly six inches at Great Falls and elsewhere. If year 2000 precipitation deficits are added to year 1999 deficits, we are pushing deficits into the four-to ten-inch range.

Two months into the 2001 Water Year, the water content of the mountain snowpack is the best indicator of how the water supply is shaping up. West of the divide, the Upper Clark Fork River Basin is nearly 80 percent of average, and the Bitterroot is about 60 percent. The other westside basins, including the Flathead, Kootenai, and Lower Clark Fork, look dismal at between 36 and 48 percent of average. East of the divide, the Missouri headwaters is at 85 percent of average, and the mainstem is about 60 percent of average. The Yellowstone River basin is only about 50 percent of average. Snow Survey records indicate that 20 percent of the annual mountain snowpack

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THAT STREAM HAS NEVER GONE DRY AS LONG AS I HAVE LIVED HERE!

By Scott Compton

There were many stories from the old timers that a particular stream, spring, or well had never gone dry as long as they could remember. This season happens to be one of the very driest in a long time for most of the state. Enforcement of water rights and handling of complaints are areas that the Water Resources Division's Regional Offices deal with each year. Issues range from too much water in a wet year to not enough to go around in dry years. Along with the general increase in complaints to handle, there were also situations that had unusual solutions or ideas to try to address with the problem. Several regional offices had these situations to deal with this year.

The Lewistown Office worked with the Department of Fish, Wildlife and Parks (DFWP), the local conservation district, and the Helena Central Office to identify and contact water users on the Smith River to try to reduce diversions to help with severely low streamflows. The users did respond, albeit with

some reservation, and flows in the river did increase. Directly contacting the users is a role the regional office had not played before in this type of situation.

The Bozeman Office also worked with DFWP to identify water users on the East Gallatin River which was being severely dewatered. In this case DFWP made the contacts on its own to try to get voluntary reductions in use. It is unknown whether there was any success in this case.

The Governor's Executive Order to simplify the process for changing a water right for temporary instream use was an innovative thought, but did not get any takers officially. However, it may have raised awareness of the problem and prompted some voluntary reductions in water use.

The Kalispell Office responded to a complaint that the county was using water for dust abatement without a water right. Typically this would be viewed as a violation, but, with smoke from the extensive fires this year creating health concerns, it was

decided that it was reasonable to consider this use an emergency appropriation as long as a Level II or higher air alert was in effect. Dust abatement has not traditionally been considered an emergency use – only direct fire suppression has.

Lower than normal groundwater levels in various areas of the state prompted concerns and in some cases accusations of waste of the resource. More eyes also seemed to be watching the water users around the state. Calls were received from concerned citizens, adjacent landowners, and affected water users as to the effectiveness or efficiency of some water users' distribution systems. Waste of water to one person is just "that's how it's been done for a very long time" to another, which is a difficult issue to try to address' especially under low water conditions.

This season was very trying for many and there were probably a few of us that wish it had been water that was actually hitting the fan! ☔

"Normal" Winter...

(Continued from page 4)

should be in place by December 1, and 50 percent by January 10.

Drought commentators often note that it is difficult to know whether a region is in the midst of a drought until some time after it has started. Today, I think it is safe to state that we are in a period of drought. Witness the problems a number of Montana municipalities have had recently supplying customers with a dependable supply of potable water. Scores of wells across the heartland of the state that have been dependable for stock water and domestic use for decades are now dry or intermittent. Even our storage reservoir safety net, replenished from 1996 through early 1998, has slipped, with prospects uncertain for the near term.

Recently, I was asked what it would take to

end the drought. The absence of snowstorms at prairie and valley floor elevations for the past three winters was a major factor in the making of the current drought. Montana needs four snowstorms across the central and eastern two-thirds of the state this winter to replenish soil moisture and recharge the aquifers, followed by average or above precipitation through June.

According to the NWS Climate Prediction Center, the official winter forecast for Montana calls for near normal temperatures and precipitation with three or four significant cold arctic intrusions, and more snowfall in the mountains and across the plains. Areas east of the divide have a good start on moisture recovery at lower elevations with the big storm of November 8-10. Now all we can do is hope and pray that Mother Nature is kind to us this winter. ☔

EMERGENCY ACTION PLAN VERIFICATION FOR DAMS

By Tom Sanburg

The DNRC Dam Safety Program is responsible for regulating over 90 high-hazard dams. To be classified as high-hazard, a probability of loss of life in the event of a dam failure must exist. The owner of each high-hazard dam is responsible for developing an emergency action plan to be used as a response guideline if the dam fails or sustains damage.

Tom Sanburg was recently hired by DNRC to review, evaluate, and verify that emergency action plans are up-to-date and effective. To accomplish this, the plans are put through the following three-phase review process:

- Phase 1. Plan Review
- Phase 2. Plan Modification
- Phase 3. Plan Testing

Phase 1. Plan Review.

The plan is read from start to finish to ensure that a layman can understand and use it. These plans are used by a variety of people including county sheriffs, Disaster and Emergency Services (DES) personnel, local engineers, and dam operators, as well as state dam safety personnel. Chapter 14, Sub-Chapter 4 of the *Administrative Rules of Montana* is used as a guideline to make sure that all required elements are included in each plan. Notification flow charts are reviewed to make sure that the correct agencies are included in the notification chain, and evacuation maps are reviewed to ensure that they are current, clean, and easy to use.

Phase 2. Plan Modification.

All comments from the plan

review process are sent to the dam owner to be integrated into the plan. The dam owner will usually coordinate the plan changes with the local DES coordinator and county sheriff so that all three are in agreement before changes are made. The dam owner is responsible for reviewing the plan annually and sending change pages to all parties that keep copies of the plan.

Phase 3. Plan Testing.

Exercise scenarios are developed to evaluate the effectiveness of the plan and the ability of agencies to use it. The most commonly used form of an exercise is a *tabletop*. Other forms of exercises include *drills*, *functional exercises* and *full-scale exercises*. In a *tabletop*, pertinent agencies are represented in an informal conference room setting. A situation narrative is presented with maps and charts, etc. The participants are evaluated on steps that they take in response to inputs from exercise simulators. Individuals are encouraged to discuss decisions in depth, and the emphasis is on slow-paced problem solving rather than rapid, spontaneous decision making. A *drill* tests the function of one element of the response system. An example of a drill is a

test of an early warning notification system. A *functional exercise* is used to test the coordination of the emergency management system under conditions of realism and stress. The functional exercise gives participants a fully simulated experience of being in a major disaster. A functional exercise requires activation of a real or simulated emergency operations center. This may be done using actual communications systems or using a portable telephone system that can be set up in a large building. In a *full-scale exercise*, agencies actually deploy response teams and simulate evacuations and/or treatment of casualties, depending on the scenario. A full-scale exercise is very expensive and requires much interagency coordination.

The DNRC Dam Safety Program plans to review at least 20 emergency action plans per year. Several exercises will be conducted each year on an adhoc basis. The exercises will be conducted in a crawl, walk, run progression, starting with orientation seminars and tabletops in preparation for functional and full-scale exercises.

Questions about emergency action plans for dams can be directed to Tom Sanburg at (406) 444-9362. 📞

MONTANA WATER TRIVIA

Which of the following is the largest river in Montana: the Kootenai, Clark Fork, Missouri or Yellowstone River?

MONTANA DISTRICT JUDGE TO RETIRE



Judge Rodeghiero

By Cindy Forgey

Judge Roy C. Rodeghiero was born in Roundup, Montana, on March 28, 1936. He graduated from Klein High School in 1954. In 1958 he graduated with a Bachelor of Arts degree in business administration from the University of Montana in Missoula. He furthered his education by graduating in 1961 from the University of Montana Law School with a Juris Doctor degree.

After graduation he practiced law in Roundup, Montana, for over 20 years, during which he was also elected and appointed as county attorney for Musselshell and Golden Valley Counties for the past 15 years. Since 1985 he's also been serving as one of Montana's five water judges.

In January 1983 he was elected as district judge for the Montana Fourteenth Judicial District Court. He still holds this position, but has plans to retire at the end of this year.

Judge Rodeghiero believes that Montana's two most

important resources are its youth and its water. He believes that we should concentrate on keeping our young people employed and living in Montana and using Montana's water for Montana first, before it's appropriated by the states downstream. Some years ago Judge Rodeghiero worked on the Bean Lake water case, which in his mind provided for the broadest legal uses for which Montana water could be appropriated. On an appeal, the Montana Supreme Court restricted the uses for which water could be appropriated. Court rulings and state legislation restricting Montana's water use and appropriation have been of serious concern to him, where Montana's waters are lost to downstream states.

This past summer, as district judge, he appointed two water commissioners on the Musselshell River below Deadman's Basin to distribute basin water released for irrigation and other purposes. With the drought this past year, the judge feels that this worked well, with everyone getting his or her water from the limited supply. He feels that, in future years, Montana will see more water commissioners on its streams to ensure the orderly, efficient, fair, and timely distribution of water for irrigation and other purposes. It is always important that Montana water be used efficiently, and this becomes more critical in drought years.

On a lighter note, the judge tells the water users that he court orders rain and snow for Montana's water supply on a regular basis. "It always works, and the water supply is always replenished." However, he does

not have the timing down to perfection yet, as the rain and snow are sometimes months late for the season's use. Praying for rain is probably more productive.

Water has always been and will always be Montana's lifeblood. It should be used fully, with the highest efficiency and benefit, and never wasted.

Judge Rodeghiero and his wife Janet live on the family ranch near Roundup where they've raised six children.

Congratulations and best wishes to Judge Rodeghiero on his retirement! 🍷

NEW!

WEBSITE FOR MAPPING

The Montana Natural Resources Information Center (NRIS) has developed a website called "Topo Finder." This site is very helpful if you need to make a strip map showing the location and topography of a dam site. It allows you to find a location by inserting the location name, quadrangle map name, grid coordinates, or section, township, and range. The position of the topographic map plot can be moved or magnified to get a better view. The maps can be printed in color with a quality comparable to that of USGS topographic maps. The web site is: <http://nris.state.mt.us/topofinder.html>

WATER RESOURCES DIVISION EMPLOYEES RECOGNIZED

By Cindy Forgey

On August 24, 2000, an awards ceremony was held in Memorial Park in Helena to recognize DNRC employees. Many Water Resources Division employees were recognized for their outstanding performance and longevity.

Jane Horton was given the Administrator's Award for her efforts and professionalism in conducting all of the research and authoring the baseline report for the Badger Creek Conservation Easement.

Special Recognition plaques were given to Jim Domino for his environmental and permitting work, to Julie McNichol for her leadership and initiative in overseeing the water rights database migration project, to

Kirk Waren for his development and implementation of the Powder River Controlled Groundwater Area, and to Milt Popovich for his expertise and dedication in providing computer assistance to the division.

Certificates of Appreciation were given to Bob Clark, Art Taylor, John Sanders, Anne Yates, Charlie Atkins, Gayle Phillips, and Shannon Voss.

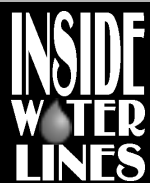
Longevity awards were given to Mike Lesnik for 5 years of service; Brian Carroll, Mike Sims, Karl Christians, Kurt Hafferman, Wes McAlpin, and Gerald Reddig for 10 years of service; Illa Phillips for 15 years of service; Ron Roman, Mike



Bud Clinch and Jack Stults present an award to Kurt Hafferman - Photo by Milt Popovich

McLane, Bob Arrington and Linda Molina for 20 years of service; Pat Boggess for 25 years of service; and John Kim and Laurence Siroky for 30 years of service.

CONGRATULATIONS TO EVERYONE FOR A JOB WELL DONE!



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**MONTANA DEPARTMENT OF NATURAL
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